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Title of Invention	CHANNEL SIMULATOR FOR WIDE BEND CDMA SIGNAL IN IMT-2000SYSTEM
Title of Invention(KPA)	CHANNEL SIMULATOR FOR BROADBAND CDMA SIGNALS IN IMT-2000 SYSTEM

Abstract(KPA)

PURPOSE: The channel simulator for broadband CDMA signals is provided to analyze wired/wireless connection call quality according to radio channel variations which is similar to actual operation environment, the implementation of handoff and handover functions, the formation of a call channel between a BTS(Base Transceiver Station) and a mobile station, and the effects of radio electric wave environment.

CONSTITUTION: The BTS(100) has a transmitter(100a) and a receiver(100c) of the first BTS(BTS1) and a transmitter(100b) and a receiving part(100d) of the second BTS(BTS2). The first directional coupler(101) terminates output power output from the transmitter (100a) of the first BTS to a terminator(102) as a high power load and couples it at a coupling degree of 10dB. The first programmable step attenuator(103) attenuates power coupled at the first directional coupler(101) to a given level. The second directional coupler (104) terminates output power output from the transmitter(100b) of the second BTS to a terminator(105) as a high power load and couples it at a coupling degree of 10dB. The second programmable step attenuator(106) attenuates power coupled at the second directional coupler(104) to a given level. The first power coupler(107) couples power attenuated at the first programmable step attenuator(103) and power attenuated at the second programmable step attenuator(106). The first channel fading emulator(108) emulates the channel variations of power coupled at the first power coupler(107). An AWGN(Additive White Gaussian Noise) generator (110) generates AWGN. An interference signal generator(109) generates an interference signal. An adder(130) adds AWGN generated from the AWGN generator(110) and the interference signal generated from the interference signal generator(109). The first distributor (111) distributes AWGN as the first power and the second power.

Abstract

It has the present invention in provides the channel simulator for the broadband CDMA signal at the IMT-2000 system analyzing wire and wireless connection voice quality in consideration of the change of the radio channel, which is similar to the real operation environment the hand-off (over) function implementation, the traffic channel formation between the base station and the mobile station and fading, interference, including, the influence of the radiowave environment etc. Like this. And the present invention has the effect that it was developed in order to be usable in the frequency band for the IMT-2000 system which was the frequency for the current development next generation mobile communication. And mobile station implement in order to bind the base station and mobile station of the multiple with duplexer, and the power combining structure or the electricity separator and it is usable. The mobile station can test the softer handoff function of the soft / hard hand-off function between many change situation of the channel according to movement and the base station and inter-sector. Moreover, the present invention has the effect that it predicts through simulation of the exact performance even though the crustaceous wireless network between the base station of the communications system which communicates by using the broadband CDMA signal and the mobile station is formed and signal is actually shot with airborne and the wireless access performance for the distortion error and various interferences is not sent in the products development and the system development period can be shortened.

Representative drawing

Fig. 2

Description

■ Brief explanation of the drawing

Figure 1 is a block diagram of the simulator for the conventional narrow band CDMA signal.

Figure 2 is a block diagram of the channel simulator for the broadband CDMA signal at the IMT-2000 system according to the embodiment of the present invention.

(the description of reference numerals of the main elements in drawings)

100: base station 101,104: the first, and the second directional coupler.

102,105: the first, and the second terminator 103,106: the first, and the second variable attenuator.

107,112: the first, and the second power combining structure 108: primary channel fading emulator.

109: reference signal 110: noise generator.

111,114: the first, and the second power divider 113: duplexer.

115- 118: the fourth mobile station through the first 119: channel fading emulator.

120: third power combiner 121,123,127: the third, the fourth, and the fifth power divider.

122,126: the third, and the fourth variable attenuater 124- 129: the eighth variable attenuater through the fifth.

■ Background Art

The present invention relates to the channel simulator for the broadband CDMA signal at the IMT-2000 system, particularly, to the channel simulator for the broadband CDMA signal at the IMT-2000 system analyzing wire and wireless connection voice quality in consideration of the change of the radio channel, which is similar to the real operation environment the hand-off (over) function implementation, the traffic channel formation between the base station and the mobile station and fading, interference, including, the influence of the radiowave environment etc.

Figure 1 shows the block diagram of the channel simulator for the conventional narrow band CDMA signal.

As shown in Figure 1, with the channel simulator for the conventional narrow band CDMA signal is the load for the high power in the terminator (3) the terminate the transmitting end (1a) of the base station (1) and reception end (1b), and the output power outputted in the transmitting end (1a) of the base station (1) With the directional coupler (2), coupled with 10dB degree of coupling and the first variable attenuater (Programmable Step Attenuator : 4), diminishing the electricity of being coupled in the directional coupler (2) to the fixed level and the duplexer (5), which provides the output power of the mobile station (MS1) for the reverse channel the duplexer (5), transmit the electricity of being attenuated from the first variable attenuater (4) in the mobile station (MS1) and the variable attenuater (6), diminishing the electricity of being provided from the duplexer (5) to the electricity of the fixed level and the power divider (7), distributing the electricity of being attenuated in the variable attenuater (6) to the first, and the second electricity and the primary channel fading emulator (8), emulating the channel variation of the first electricity distributed in the power divider (7) and the second channel fading emulator (9), emulating the channel variation of the second electricity distributed in the power divider (7) and the first noise generator (12), producing the AWGN (Additive White Gaussian Noise) and the first carrier to noise generator (10), generated the interference signal and AWGN generated in the first noise generator (12) and the summer (18), adding up the interference signal generated in the first carrier to noise generator (10) and the second noise generator (13), producing AWGN and the second carrier to noise generator (11) generated the interference signal. It is comprised of the summer (19) adding up AWGN generated in the second noise generator (13) and the interference signal generated in the second carrier to noise generator (11), the electricity of being faded in the primary channel fading emulator (8) and the first power combining structure (14) uniting AWGN generated in the first noise generator (12), the electricity of being emulated in the second channel fading emulator (9) and the second power combining structure (15) uniting the noises generated in the second noise generator (13), the third variable attenuater (16), and the fourth variable attenuater (16). The third variable attenuater (16) diminishes the electricity of being combined in the first power combining structure (14) to the electricity of the fixed level and provided to the reception end (1b) of the base station (1). The fourth variable attenuater (16) diminishes the electricity of being combined in the second power combining structure (15) to the electricity of the fixed level and provided to the reception end (1b) of the base station (1).

In this way, as described in detail, it is the operation of the channel simulator for the comprised conventional narrow band CDMA signal the same like next.

Firstly, the output power outputted in the transmitting end (1a) of the base station (1) is terminated after the directional coupler (2) in the terminator (3) to the high power load. If it is coupled to 10dB degree of coupling and it is provided to the first variable attenuater (4), the first variable attenuater (4) lessens to level as much as the electricity of being the electricity of being coupled in the directional coupler (2) attenuated in airborne due to distance to the mobile station. The electricity of being attenuated is transmitted after the duplexer (5) in the mobile station (MS1).

In the meantime, the output power of the mobile station (MS1) is provided to the second variable attenuator (6) after the duplexer (5). The second variable attenuator (6) diminishes the electricity of being provided from the duplexer (5) to the electricity of the level canning be input to the first, the second channel fading emulator (8), and (9).

The electricity of being attenuated in the variable attenuater (6) is distributed after the power divider (7) to the first, and the second electricity. The electricity is provided to the respective first, the second channel fading emulator (8), and (9).

The channel variation of the first electricity distributed in the power divider (7) is emulated by the primary channel fading emulator (8). The channel variation of the second electricity distributed in the power divider (7) is emulated by the second channel fading emulator (9).

In the meantime, the first AWGN generator (12) produces AWGN. It is generated the interference signal from the first carrier to noise generator (10). And the summer (18) adds up AWGN generated in the first noise generator (12) and the interference signal generated in the first carrier to noise generator (10). The second AWGN generator (13) produces AWGN. It is generated the interference signal from the second carrier to noise generator (11). And the summer (19) adds up AWGN generated in the second noise generator (13) and the interference signal generated in the second carrier to noise generator (11).

It unites AWGN generated in the electricity and the first AWGN generator (12) emulated in the primary channel fading emulator (8) and the first power combining structure (14) provides for the third variable attenuater (16). The electricity that the second power combining structure (15) is emulated in the second channel fading emulator (9) and the noises generated in the second noise generator (13) are united and it provides to the fourth variable attenuater (17).

It lessens to the electricity of about level in which the signal which is the electricity of being combined in the first power combining structure (14) launched in the mobile station is attenuated by the radiowave environment and the third variable attenuater (16) provides for the receive port (Rx1 A) of the reception end (1b) of the base station (1). It lessens to the electricity of about level that the signal which is the electricity of being combined in the second power combining structure (15) launched in the mobile station is attenuated by the radiowave environment and the fourth variable attenuater (16) provides for the receive port (Rx1 B) of the reception end (1b) at the base station (1).

But the channel simulator for the conventional narrow band CDMA signal as to the system, using the broadband CDMA signal which is the current development next generation mobile communications the serving frequency and bandwidth does not fit. In addition, bandwidth can simulate only channel between the base station of the canine which it moreover simplifies and one terminal. Therefore, it had the impossible problem to test function including the change of the radio channel according to movement between the terminal and hand-off etc. In order to develop the special system for solving this problem, the special system had the disadvantage that the time, the personnel and development cost were very much required.

■ Technical Task

Therefore, it has the object of the present invention in provides the channel simulator for the broadband CDMA signal at the IMT-2000 system analyzing wire and wireless connection voice quality in consideration of the change of the radio channel, which is similar to the real operation environment the hand-off (over) function implementation, the traffic channel formation between the base station and the mobile station and fading, interference, including, the influence of the radiowave environment etc.

■ Structure & Operation of the Invention

The channel simulator for the broadband CDMA signal according to a preferred embodiment of the present invention for achieving this kind of purpose terminates the output power outputted the terminate, and the first directional coupler, coupled with 10dB degree of coupling and the electricity of being coupled in the first directional coupler in the first terminator to the load for the high power to the fixed level in the transmitting end of the first variable attenuater, lessening and predetermined base station outputted in the transmitting end of the predetermined base station in the second terminator with the load for the high power as to the simulator simulating the channel for the broadband CDMA signal between the transmitting end of a plurality of base stations and the reception end and plurality of mobile stations. With the duplexer, which provides the output power of a plurality of mobile stations for the reception end of a plurality of base stations it transmits the second directional coupler, coupled with 10dB degree of coupling and the first power combining structure, uniting the respective electricity of being attenuated the electricity of being coupled in the second directional coupler with the fixed level in the second variable attenuator, lessening and the first, and the second variable attenuator and the second power combining structure, uniting the first electricity distributed in the primary channel fading emulator, emulating the channel variation of the electricity of being combined in the first power combining structure and the AWGN generator, producing the AWGN (Additive White Gaussian Noise) and the carrier to noise generator, generated the interference signal and the first power splitter, distributing AWGN generated in the AWGN generator and the summer adding up the interference signal generated in the carrier to noise generator and AWGN generated in the AWGN generator to the first, and the second electricity and electricity and the first power splitter emulated from the primary channel fading emulator and the electricity of being combined in the second power combining structure towards a plurality of mobile stations and the second power divider distributing the electricity of being provided in duplexer to the fourth electricity through the first, or provides the inputted fourth electricity through the first for duplexer in combination with. The first the tenth variable attenuater, which lessens the fourth power divider, distributing the electricity of being attenuated in the sixth variable attenuater, and the second channel fading emulator, emulating the channel variation of the output power of duplexer and the seventh variable attenuater, lessening the first electricity distributed in the third power distributor, distributing the electricity of being emulated from the second channel fading emulator and the third power combiner, uniting the second electricity distributed in the first power splitter and the electricity of being combined in the third power combiner to the first, and the second electricity and the third power distributor to the electricity of the fixed level and seventh variable attenuater to the first, and the second electricity through the third provided for the second power divider and the eighth which it provides to the reception end of the predetermined base station the eighth lessen the respective distributed first, and the second electricity in the fourth power divider to the electricity of the fixed level, and the ninth variable attenuater, and the second electricity distributed in the third power distributor to the electricity of the fixed level it diminishes each output power of a plurality of mobile stations it provides to a plurality of mobile stations it lessens the respective distributed first or the fourth electricity in the second power divider to the electricity of the fixed level and the electricity of being attenuated in the tenth variable attenuater. In the fifth power divider, distributed to the second electricity and fifth power divider, the respective distributed first, and the second electricity are lessened to the electricity of the fixed level and it is comprised of the eleventh provided for the reception end of the predetermined base station, and the twelfth variable attenuater.

Hereinafter, referring to the figure as described in detail, it is the same as that of the next time.

Figure 2 shows the block diagram of the channel simulator for the broadband CDMA signal at the IMT-2000 system according to a preferred embodiment of the present invention.

As shown in Figure 2, the channel simulator for the broadband CDMA signal at the IMT-2000 system according to a preferred embodiment of the present invention terminates the output power outputted the output power outputted in the transmitting end (100a) of the base station (100), having the transmitting end (100b) of the transmitting end (100a) of the first base station (BTS1) and reception end (100b) and the second base station (BTS2) and reception end (100d) and the first base station (BTS1) in the terminator (102) to the load for the high power in the transmitting end (100b) of the terminate, and the first directional coupler (101), coupled with 10dB degree of coupling and the first variable attenuater (103), diminishing the electricity of being coupled in the first directional coupler (101) to the fixed level and the second base station (BTS2) in the terminator (105) with the load for the high power With the duplexer (113) provided for the first the output power of the fourth mobile station (MS1-MS4) through the first, the second base station (BTS1), the reception end (100c) of (BTS2), and (100d) the electricity of being combined in the first power splitter (111), distributing AWGN generated in the second directional coupler (104), coupled to 10dB degree of coupling and the first power combining structure (107), uniting the respective electricity of being attenuated the electricity of being coupled in the second directional coupler (102) with the fixed level in with the second variable attenuator (106), first, second variable attenuator (103), (106) lessening and the primary channel fading emulator (108), emulating the channel variation of the electricity of being combined in the first power combining structure (107) and the AWGN generator (110), producing the AWGN (Additive White Gaussian Noise) and the carrier to noise generator (109), generated the interference signal and the summer (130), adding up the interference signal generated in AWGN and the carrier to noise generator (109) generated in the AWGN generator (110) and AWGN generator (110) to the first, and the second electricity and the second power combining structure (112), uniting the first electricity distributed in the electricity and the first power splitter (112) emulated from the primary channel fading emulator (108) and the second power combining structure (112) is transmitted towards the fourth mobile station (MS1-MS4) through the first. The respective distributed first in the third power distributor (121), which distributes the electricity of being combined in the sixth variable attenuater (115-118), which it provides to the second power divider (114) it diminishes each output power of the fourth mobile station (MS1-MS4) through the first through the third and the second channel fading emulator (119), emulating the channel variation of the output power of the duplexer (113) and the third power combiner (120), uniting the second electricity distributed in the electricity and the first power splitter (111) emulated from the second channel fading emulator (119) and the third power combiner (120) to the first, and the second electricity it provides to the fourth mobile station (MS1-MS4) through the first the inputted fourth electricity lessens the respective distributed first or the fourth electricity in the second power divider (114), provided for the duplexer (113) and the second power divider (114) to the electricity of the fixed level it unites the fourth electricity through the first it distributes the electricity of being provided in the duplexer (113) to the fourth electricity through the first and the seventh variable attenuater (122), lessening the first electricity distributed in the third power distributor (121) to the electricity of the fixed level and the fourth power divider (123), distributing the electricity of being attenuated in the seventh variable attenuater (122) to the first, and the second electricity and fourth power divider (123). The second electricity is lessened to the electricity of the fixed level and it is comprised of the tenth variable attenuater (126) lessening the second electricity distributed in the eighth, ninth variable attenuater (124), with (125), third power distributor (121) provided for the reception end (100c) of the first base station (BTS1) to the electricity of the fixed level, the fifth power divider (127) distributing the electricity of being attenuated in the tenth variable attenuater (126) to the first, and the second electricity, and the eleventh. The eleventh, lessens the respective distributed first, and the second electricity in the fifth power divider (127) to the electricity of the fixed level and provided to the reception end (100d) of the second base station (BTS2) the twelfth variable attenuater (128), and (129).

In this way, as described in detail, it is the operation of the channel simulator for the broadband CDMA signal at the comprised IMT-2000 system according to a preferred embodiment of the present invention the same like next.

Firstly, the output power outputted in the transmitting end (100a) of the first base station (BTS1) consists of the load for the high power after the first directional coupler (101) in the terminator (102) with the terminate (terminate). If it is coupled to 10dB degree of coupling and it is provided to the first variable attenuater (103), the first variable attenuater (103) diminishes the electricity of being coupled in the first directional coupler (101) to the fixed level.

Moreover, the output power outputted in the transmitting end (100b) of the second base station (BTS2) is terminated after the second directional coupler (104) in the terminator (105) to the load for the high power. If it is coupled to 10dB degree of coupling and it is provided to the second variable attenuator (106), the second variable attenuator (106) diminishes the electricity of being coupled in the second directional coupler (102) to the fixed level.

In the first, the second variable attenuator (103), and (106) is the controller (non illustration), it is remotely controlled through the GPIO interface. And each output power quantity is controlled by each first, the second variable attenuator (103), and (106). It can become intimate and the respective first or fourth terminal (MS1-MS4) just virtually can simulate the situation which becomes distant in the first, the second base station (BTS1), and (BTS2) in other words.

In the first power combining structure (107) is the first, the second variable attenuator (103), and (106), the respective electricity of being attenuated is united and it provides for the primary channel fading emulator (108). The channel variation of the electricity of being combined in the first power combining structure (107) is emulated by the primary channel fading emulator (108).

Similarly the change of the radio channel actually is emulated by the primary channel fading emulator (108) with the radio environment. And it has the function of diversifying to many signal effect and level the input voltage according to the channel variation including the fading. And it has the independent channel. The remote programming of the primary channel fading emulator (108) can be controlled with the GPIB interface which is built in equipment.

In the meantime, the AWGN generator (110) produces the AWGN (Additive White Gaussian Noise). In the AWGN generator (110) is the forward direction and reverse channel, it is the apparatus for respecting the interference effect by the other user and base station with betting and producing AWGN. At this time, the generated intensity of AWGN is set up according to required C / N (Carrier to Noise), C / No (Carrier to Noise Density), and C / I (Carrier to Interference) and Eb / No (Bit Energy to Noise Density). Moreover, the AWGN generator (110) can look around the in other words intentional influence about the interference signal which receives the input of the extension CW generator (the non illustration) and which does not desire.

The first power splitter (111) distributes AWGN generated in the AWGN generator (110) to the first, and the second electricity. It unites the electricity of being emulated from the primary channel fading emulator (108) and the first electricity distributed in the first power splitter (112) and the second power combining structure (112) provides for the second power divider (114) after the duplexer (113).

The second power divider (114) distributes the electricity of being provided in the duplexer (113) to the fourth electricity through the first. It lessens the respective distributed first or the fourth electricity in the second power divider (114) to the electricity of the fixed level and the sixth variable attenuater (115-118) through the third provides for the fourth mobile station (MS1-MS4) through the first.

At this time, the number of mobile stations are possible through the port count of the second power divider (114) with any kind of structure more than 2. And it controls the relatively signal degrade about fourth mobile station (MS1-MS4) through each first and the sixth variable attenuater (115-118) through the third can simulate the near-far of distance from the base station to the terminal.

In the meantime, it is attenuated after the sixth variable attenuater (115-118) through the third and the output power of the fourth mobile station (MS1-MS4) through the first provides for the second power divider (114). It unites electricities provided from the sixth variable attenuater (115-118) through the third and the second power divider (114) provides for the second channel fading emulator (119) after the duplexer (113).

The channel variation of the output power of the duplexer (113) is emulated by the second channel fading emulator (119). The second channel fading emulator (119) performs the operation like the primary channel fading emulator (108) which it already explains.

It unites the electricity of being emulated from the second channel fading emulator (119) and the second electricity distributed in the first power splitter (111) and the third power combiner (120) provides for the third power distributor (121).

After the third power distributor (121) distributes the electricity of being combined in the third power combiner (120) to the first, and the second electricity, the first electricity is provided for the seventh variable attenuater (122) and the second electricity is provided for the tenth variable attenuater (126).

The seventh variable attenuater (122) lessens the first electricity distributed in the third power distributor (121) to the electricity of the fixed level. The fourth power divider (123) distributes the electricity of being attenuated in the seventh variable attenuater (122) to the first, and the second electricity. In the eighth, the ninth variable attenuater (124), and (125) is the fourth power divider (123), the respective distributed first, and the second electricity are lessened to the electricity of the fixed level and it provides to the receive port (Rx1 A) (Rx1 B) of the reception end (100c) of the first base station (BTS1).

And the tenth variable attenuater (126) lessens the second electricity distributed in the third power distributor (121) to the electricity of the fixed level. The fifth power divider (127) distributes the electricity of being attenuated in the tenth variable attenuater (126) to the first, and the second electricity. In the eleventh, the twelfth variable attenuater (128), and (129) is the fifth power divider (127), the respective distributed first, and the second electricity are lessened to the electricity of the fixed level and it provides to the receive port (Rx2 A) (Rx2 B) of the reception end (100d) of the second base station (BTS2).

As described above, the twelfth variable attenuater (122), (124-126), (128), (129) through the seventh is remotely controlled in the controller (non illustration) through the GPIO interface with a . And each output power quantity is controlled by the twelfth variable attenuater (122), (124-126), (128), (129) through each seventh. It can become intimate and the respective first or fourth terminal (MS1-MS4) just virtually can simulate the situation which becomes distant in the first, the second base station (BTS1), and (BTS2) in other words.

And the input of 2 has the reception end (100c) of the first base station (BTS1) and reception end (100d) of the second base station (BTS2) at each first, the second base station (BTS1), and (BTS2) since using the space diversity. And the input is controlled with the different variable attenuater (124), (125), (128), (129). Therefore, the input voltage can be differently given according to situation.

■ Effects of the Invention

Like this. And the present invention has the effect that it was developed in order to be usable in the frequency band for the IMT-2000 system which was the frequency for the current development next generation mobile communication. And mobile station implement in order to bind the base station and mobile station of the multiple with duplexer, and the power combining structure or the electricity separator and it is usable. The mobile station can test the softer handoff function of the soft / hard hand-off function between many change situation of the channel according to movement and the base station and inter-sector.

Moreover, the present invention has the effect that it predicts through simulation of the exact performance even though the crustaceous wireless network between the base station of the communications system which communicates by using the broadband CDMA signal and the mobile station is formed and signal is actually shot with airborne and the wireless access performance for the distortion error and various interferences is not sent in the products development and the system development period can be shortened.

That is, the present invention has the effect that the hardware equipment shortened the development period, the cost and degree of danger so that the development of short-term be facilitated by to the utmost using the commercial measuring apparatus (COTS) and the part could save in the existing market. And the software implements UI in the form of GUI by using the LabVIEW software of the National instruments. It is fast and all measuring instruments and part easily are controlled automatically and the malfunction by the human error and damage is minimized.

Scope of Claims

■ Claim 1:

As to the simulator simulating the channel for the broadband CDMA signal between the transmitting end of a plurality of base stations

and the reception end and plurality of mobile stations, the output power outputted the terminate, and the first directional coupler: coupled with 10dB degree of coupling and the electricity of being coupled in the first directional coupler in the first terminator to the load for the high power to the fixed level in the transmitting end of the predetermined base station and the first variable attenuater: lessening outputted in the transmiting end of the predetermined base station is terminated in the second terminator with the load for the high power. With the duplexer which provides the output power of a plurality of mobile stations for the reception end of a plurality of base stations it transmits the second directional coupler: coupled with 10dB degree of coupling and the first power combining structure: uniting the respective electricity of being attenuated the electricity of being coupled in the second directional coupler with the fixed level in the second variable attenuator: lessening and the first, and the second variable attenuator and the primary channel fading emulator: emulating the channel variation of the electricity of being combined in the first power combining structure and the AWGN generator: producing the AWGN (Additive White Gaussian Noise) and the carrier to noise generator generated the interference signal and the first power splitter distributing AWGN, generated in the AWGN generator the summer adding up the interference signal generated in the carrier to noise generator and AWGN generated in the AWGN generator to the first, and the second electricity and the electricity of being emulated from the primary channel fading emulator and the second power combining structure: uniting the first electricity distributed in the first power splitter and the electricity of being combined in the second power combining structure towards a plurality of mobile stations and the second power divider distributing the electricity of being provided in duplexer to the fourth electricity through the first, or provides the inputted fourth electricity through the first for duplexer in combination with. The first the tenth variable attenuater: which lessens the second channel fading emulator: emulating the channel variation of the output power of the sixth variable attenuater: and duplexer through the third provided for the second power divider and the third power distributor: distributing the electricity, of being emulated from the second channel fading emulator the third power combiner: uniting the second electricity distributed in the first power splitter and the electricity of being combined in the third power combiner to the first, and the second electricity and the fourth power divider: distributing the electricity of being attenuated in the seventh variable attenuater: lessening the first electricity distributed in the third power distributor to the electricity of the fixed level and seventh variable attenuater to the first, and the second electricity and the eighth which it provides to the reception end of the predetermined base station the eighth lessen the respective distributed first, and the second electricity in the fourth power divider to the electricity of the fixed level, and the ninth variable attenuater: and the second electricity distributed in the third power distributor to the electricity of the fixed level it diminishes each output power of a plurality of mobile stations it provides to a plurality of mobile stations it lessens the respective distributed first or the fourth electricity in the second power divider to the electricity of the fixed level and the electricity of being attenuated in the tenth variable attenuater. The channel simulator for the broadband CDMA signal at the IMT-2000 system wherein in the fifth power divider: distributed to the second electricity and fifth power divider, the respective distributed first, and the second electricity are lessened to the electricity of the fixed level and it is comprised of the eleventh provided for the reception end of the predetermined base station, and the twelfth variable attenuater.

■ Claim 2:

The channel simulator for the broadband CDMA signal at the IMT-2000 system of claim 1, wherein the twelfth variable attenuater through the first is remotely controlled in controller through the GPIO interface; and each output power quantity is controled.

■ Claim 3:

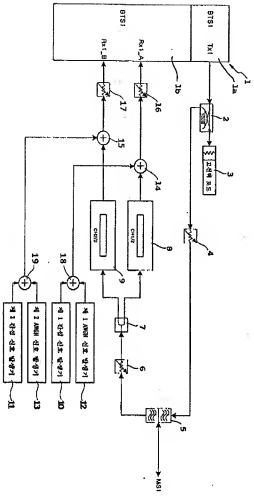
The channel simulator for the broadband CDMA signal at the IMT-2000 system of claim 1, wherein the first, and the second channel fading emulator emulate the change of the radio channel with the real radio environment; and the change diversifies the input voltage according to the channel variation including the fading to many signal effect and level.

■ Claim 4:

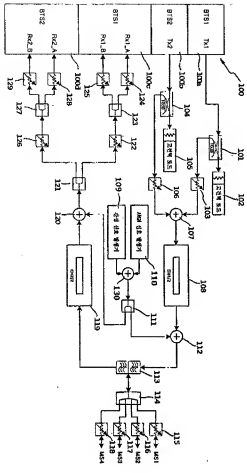
The channel simulator for the broadband CDMA signal at the IMT-2000 system of claim 1, wherein the intensity of AWGN generated in the AWGN generator is set up according to required C / N (Carrier to Noise), C / No (Carrier to Noise Density), and C / I (Carrier to Interference) and Eb / No (Bit Energy to Noise Density).

Drawing

■ Fig. 1


BTS1
Rx
Tx
1
1a
1b
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
CHIP
CHIP
MOT

■ Fig. 2



Legal Status

Date	Type of Document	Status
19990831	Patent Application	Received
20040315	Notice of Reason for Return of Documents	Delivery Completed
20040826	Request for Examination	Received
20040830	Notice of Reason for Return of Documents	Delivery Completed
20060323	Written Decision on Registration	Delivery Completed

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